Question 5: Volatility and GARCH estimates

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Abstract

This question is broken down into two sections, In section 1, I evaluate the statement that the rand has been one of the most volatile currencies in recent years. Tackling this question I calculate the standard deviation of nine currencies and compare. From the plots it is evident that the Rand is one of the most volatile in recent years. In the second section I attampt to tackle the problem using a GARCH model.

1. Introduction

In the first part of the question I analyze the statement that the Rand has been one of the most volatile stocks in recent years. For my analysis I find eight other currencies of which I can compare the volatility of the Rand to. The choice of which currencies to compare is base on historical performance. I first analyse the standard deviation of the currencies from prior 1990 to 2021. Over this long period it is not evident that the rand is one of the mos volatile. More specifically the questions states over recent years. Thus fr the next part of the analysis I shorten the time horizon to three years, comparing the volatility of the currencies in question to that of the Rand from 2018 to 2021. Here it is more evident that the Rand is one of the most volatile currencies. However, the Rand is not drastically more volatile than the Singapore, Brazilian and Indian currencies.

In the next section I dive into a GARCH model analysis. Unfortunetly I ran out of time to do this part of the question

1.1. Loading relvant data from the question

1.2. Evaluating the volatility of the Rand against other currencies

In the first part of this question I need to comment on the statement that the Rand has been one of the most volatile currencies. To start this analysis I will first prepare the data available.

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1.2.1. Data preperation

For this section of the analysis I will be using the cncy data set which contains information on the currency values of 41 currencies. For the analysis it will an over whelming amount of information if I compare the ZAR to all of these currencies. I will therefore pick a few to do the comparison on. The way in which I will choose which currencies to compare the rand to is based of prior knowledge. I want to compare the rand to the historically most volatile currencies as well as the historically least volatile currencies and currencies that are historically moderately volatile.

For the historically most volatile currencies I will be evaluating the Argentinian currency, the Turkish currency and the Brazilian currency. For the historically least volatile currencies I will be evaluating Singapore currency, the Canadian currency and the Australian currency. For the historically moderate currencies I will be evaluating Mexico and India.

1.3. Volatility comparison plot from prior 1993 for 9 countries

From the plot below it is not plainly evident that the South African currency is the most volatile. We are however, looking at a very large scale and the question pertains to recent years. Therefore to gain a better understanding of the volatility of the South African rand in recent years I will look at the last 3 years of standard deviation for each currency in question.

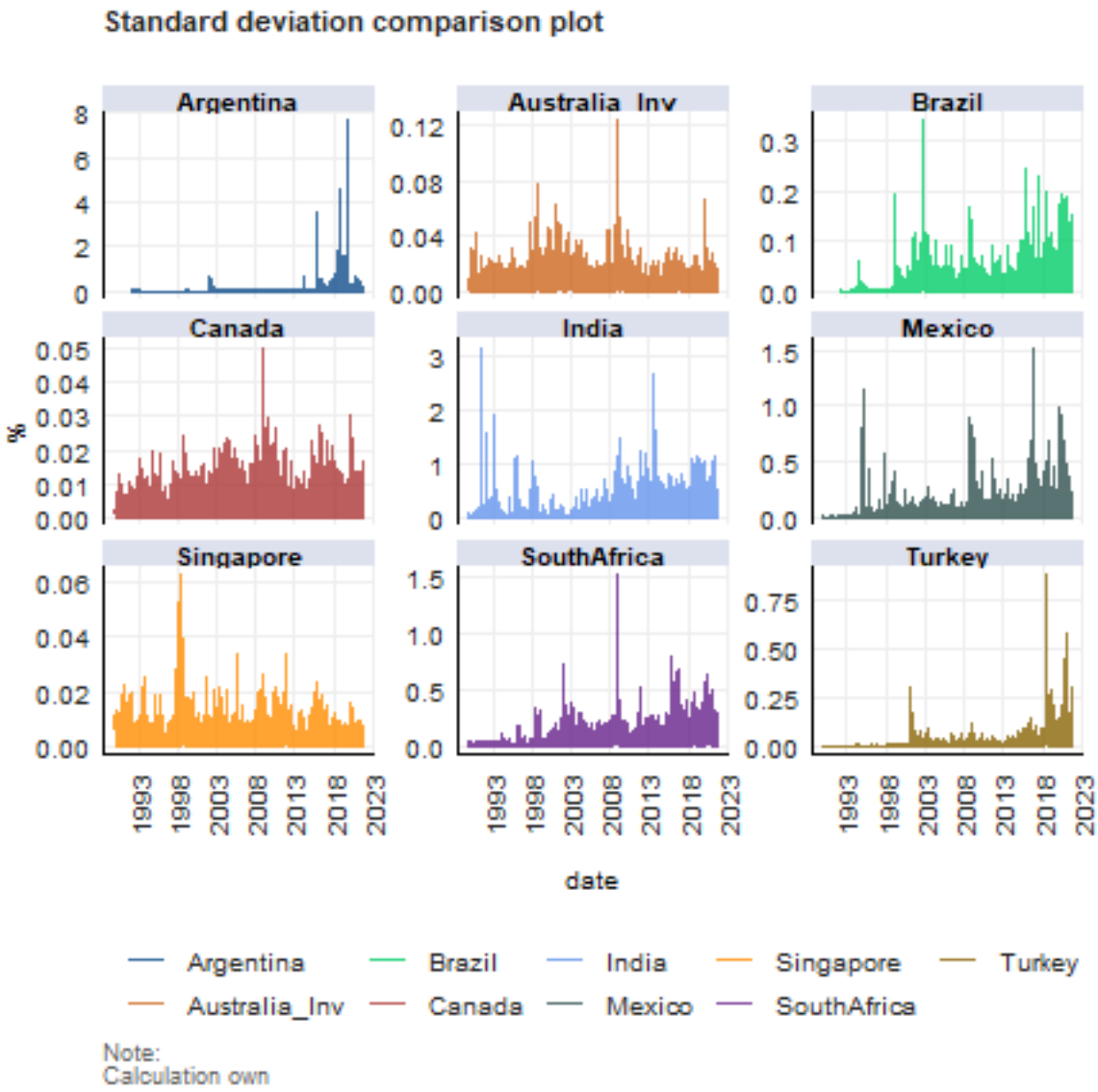

Figure 1.1: Long term volatility comparison plot

1.4. Volatility comparison plot over last 3 years for 9 countries

To gain a better understanding of the volatility of the Rand relative to its peers in the last few years I will be shorten the time horison inspected. The data ends in 2021. I will therefore look at the last 3 years of standard deviation. More specifically, from 2018.

From the more recent volatility plot comparison, the Rand does seem to be one of the more volatile currencies in our data set. However, it is not strikingly more volatile than Singapore, India or Brazil. Thus, to conclude, the Rand has been on eo fhte more volatile currencies in recent years.

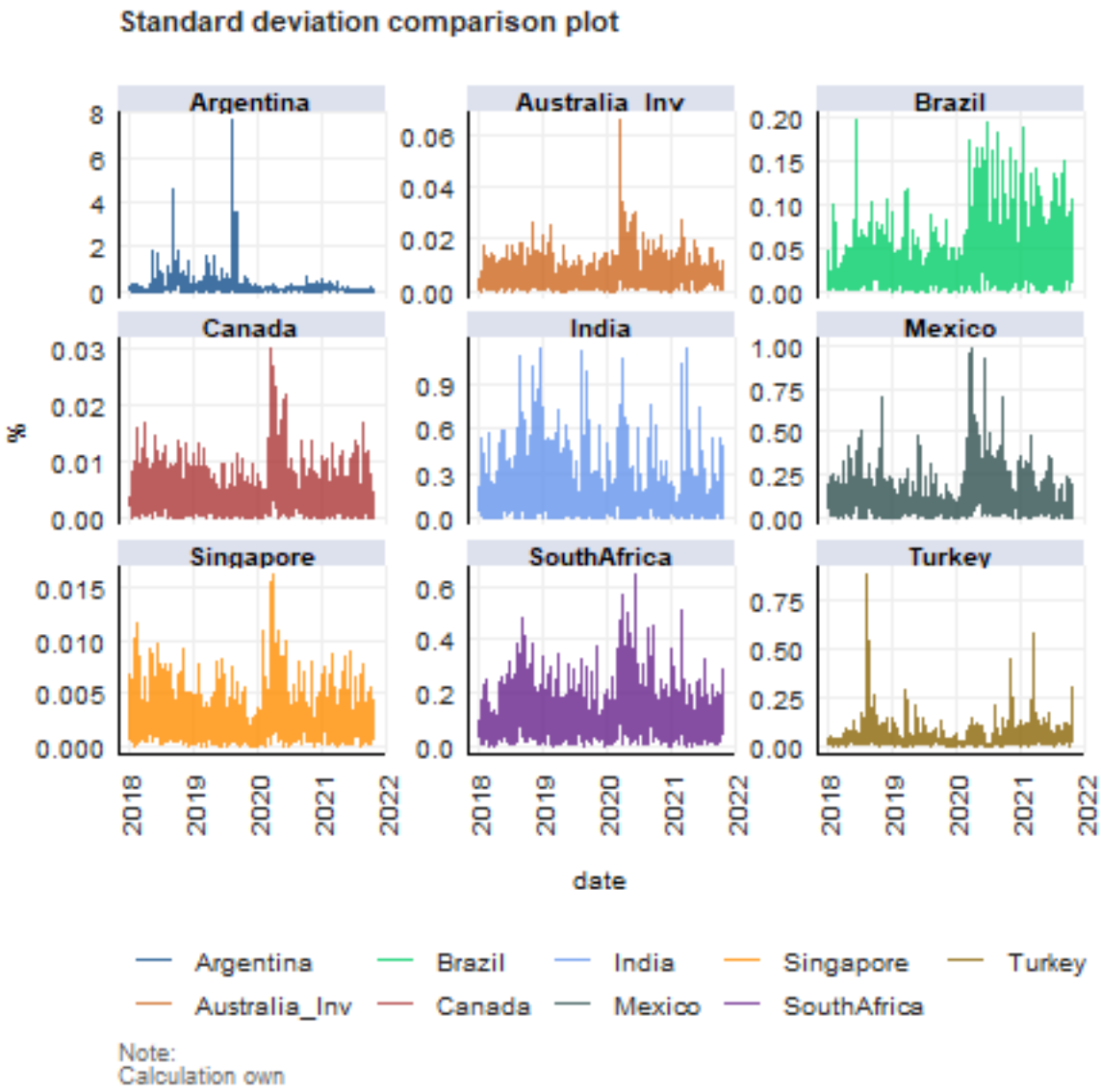

Figure 1.2: 3 year volatility comparison plot

References

Appendix

Appendix A

Some appendix information here

Appendix B